

AMENDMENTS TO THE SPECIFICATION

IN THE SPECIFICATION:

Please replace paragraph 11 with the following new paragraph:

[0011] Therefore, ~~an objecta~~ feature of the present invention is to provide an optical moving amount detecting device that is small in size and inexpensive and that is capable of accurately measuring a moving amount of a detection object having smooth surfaces, and to provide electronic equipment having the same.

Please replace paragraph 12 with the following new paragraph:

[0012] Another ~~object~~ feature of the invention is to provide a conveyance processing system that is capable of accurately measuring a position of a detection object, conveying the detection object to a specified position, and performing specified processing.

Please replace paragraph 13 with the following new paragraph:

[0013] In ~~order to achieve the objects~~ accordance with embodiments of the invention, an optical moving amount detecting device of the invention comprises:

a light emitter,

a light receiver,

a first optical system for making light from the light emitter into a linear beam extending in parallel with a direction of movement of a detection object and casting the linear beam on the detection object,

a second optical system by which a linear reflected beam that is the linear beam reflected from the detection object is made incident on the light receiver,

a storage unit for storing first output waveform signals that are outputted from the light receiver receiving the linear reflected beam at a first time point and that represent an output distribution of the linear reflected beam along a longitudinal direction thereof and

storing second output waveform signals that are outputted from the light receiver receiving the linear reflected beam at a second time point and that represent an output distribution of the linear reflected beam along the longitudinal direction thereof, and

a moving amount detecting unit for detecting an amount of shift between the first output waveform signals and the second output waveform signals in the longitudinal direction of the linear reflected beams and detecting a moving amount of the detection object on basis of the amount of shift.

Please replace paragraph 14 with the following new paragraph:

[0014] In accordance with the optical moving amount detecting device of embodiments of the invention, at the first time point, light from the light emitter is made into the linear beam extending in parallel with the direction of movement of the detection object and the beam is cast on the detection object. The linear reflected beam reflected from the detection object is made incident on the light receiver, and then the first output waveform signals outputted from the light receiver are stored into the storage unit. At the second time point after that, similarly, light from the light emitter is made into the linear beam, which is cast on the detection object. The linear reflected beam reflected from the detection object is made incident on the light receiver, and then the second output waveform signals outputted from the light receiver are stored into the storage unit. The moving amount detecting unit detects the amount of shift between the first output waveform signals and the second output waveform signals in the longitudinal direction of the linear reflected beams and detects the moving amount of the detection object on basis of the amount of shift.

Please replace paragraph 28 with the following new paragraph:

[0028] The electronic equipment ~~of~~according to embodiments of the present invention comprises the optical moving amount detecting device of embodiments of said invention.

Please replace paragraph 30 with the following new paragraph:

[0030] The conveyance processing system ~~of~~according to embodiments of the present invention comprises:

the optical moving amount detecting device of said invention,
a conveying section for conveying the detection object,
a processing section for performing specified processing for
the detection object, and

a controller for controlling the conveying section so as to align with a target position a position of the detection object after conveyance, on basis of a moving amount of the detection object that is detected by the optical moving amount detecting device.

Please replace paragraph 31 with the following new paragraph:

[0031] In accordance with the conveyance processing system of embodiments of the invention, the position of the detection object is accurately detected, and the positional shift of the detection

object is automatically corrected on condition that the detection object is not in the specified position. Thus the specified processing can be performed in correct positions on the detection object.

Please replace paragraph 51 with the following new paragraph:

[0051] The first optical system 31 is composed of a collimating lens 12 and a cylindrical lens 13. The system collimates light from the light emitter 11 by the collimating lens 12, passes the light through the cylindrical lens 13, thereafter makes the light into a linear beam having a cross section taken normal to a direction of light propagation that has a length and a width, the length extending in parallel with the direction of the movement of the detection object 10, and casts the beam on the detection object 10. Then an image 18a of the linear beam having a predetermined length is formed along the direction of the movement of the detection object 10 on a surface of the detection object 10. In Fig. 1, the detection object 10 moves from back side to front side as shown by arrow α. A cylindrical lens may be substituted for the collimating lens 12 and, in that case, light from the light emitter 11 is converged on only one side.

Please replace paragraph 53 with the following new paragraph:

[0053] As shown in Fig. 2, the image 18a of the linear beam is formed so that the length of the linear beam is in parallel with

the direction of the movement of the detection object 10 which direction is shown by the arrow α . A length of the image is set at several millimeters and a width thereof is set at tens of micrometers. A light intensity distribution of the linear beam with respect to a longitudinal direction thereof is preferably uniform.

Please replace paragraph 58 with the following new paragraph:

[0058] Figs. 6A-6B are diagrams illustrating output values from the photodetectors 17a in the whole area 22 of the light receiver 17 before and after movement of the detection object 10. As shown in Fig. 6A, light from the specified area 10a at the first time point is received by a first partial area 22a of the light receiver 17. As shown in Fig. 6B, on the other hand, light from the specified area 10a at the second time point is received by a second partial area 22a-area 22b of the light receiver 17. Thus output values generally identical to those from the first partial area 22a appear in the second partial area 22b. A shift between the first partial area 22a and the second partial area 22b is calculated on basis of positions of the photodetectors 17a, and a moving amount is thereby detected.

Please replace paragraph 74 with the following new paragraph:

[0074] In accordance with the optical moving amount detecting device of embodiments of the invention that is configured as described above, a moving amount of a detection object 10 that, has comparatively smooth surfaces can be detected accurately. The moving amount detecting device can be made small in shape and inexpensive because the device is composed of a comparatively small number of components and because the device can perform signal processing more easily than the moving amount detecting devices described above do.

Please replace paragraph 75 with the following new paragraph:

[0075] In accordance with electronic equipment having the optical moving amount detecting device, a moving amount of an object in and out of the electronic equipment can be detected accurately by the optical moving amount detecting device. On condition that the electronic equipment is equipment such as printer, i.e., electronic equipment that sequentially and repetitively carries out steps of conveyance, stoppage, process, and the like for an object (such as paper form), a conveyance processing system that is capable of performing specified processing for correct positions on the object (detection object) is provided by use of the optical moving amount detecting device of embodiments of the invention.